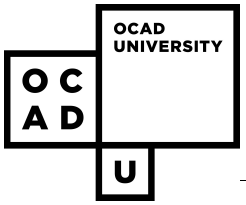

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Value of design competencies within an outcomes-based education

Mousavihejazi, Bahar and Borja de Mozota, Brigitte

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VALUE OF DESIGN COMPETENCIES WITHIN AN OUTCOMES-BASED EDUCATION

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ABSTRACT

What should we teach to the designers of the future so they can embrace complexity by developing forms that are creative and human, and consider the different aspects of life in a changing world? What are the specific learning outcomes that should be formulated in the planning of a design curriculum? What are the most important design competencies that should be considered in this process? How would design competencies add value to design education? In this paper, we intend to study the value of design competencies within an Outcomes-Based Education (OBE) curriculum framework by understanding the interconnections between design competencies and their related learning outcomes. In this order, we first determine design competencies and sub-competencies as "the proven abilities to use knowledge, skills and personal, social and/or methodological abilities, in work or study situations and in professional and personal development" (Savic & Kashef 2013, p. 990). Then we revisit the definition of design as a profession in the 21st century by a comparative analysis of designers' perception of their own knowledge, skills and attitudes acquired through their education and applied within their design practice. Finally, we will discuss a new model of design competencies, which would enable educators to articulate practice-based learning outcomes that will in turn enhance the value of design education in the new era.

Keywords: Value, designer skills, competencies, design profession, learning outcomes, creativity, outcomes-based education, design education

1 INTRODUCTION

Designers and design educators are facing tremendous changes and challenges in the 21st century. In one hand, designers are embracing complexity by moving from 'makers of things' to that of 'strategic thinkers' who aim to bring meaningful and human design solutions to social, cultural and environmental problems within a fast-pace economy. On the other hand, they should be able to prove the value and effectiveness of design in an ever-increasing high-tech and competitive business environment. The question is "How design education is adapting its outcomes to the challenges that new designers are facing?"

Furthermore, the globalization of labor markets and competition in a knowledge-based economy have placed increased demand on higher education systems in order to develop a wide variety of programs that would provide students with proper knowledge, skills and competencies aimed to respond to the changing needs of the workplace.

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Value of Design Competencies Within an Outcomes-Based Education

Bahar Hejazi and Brigitte Borja de Mozota

In this paper[1], we intend to study the value of design competencies within an Outcomes-Based Education (OBE) curriculum framework by identifying the competencies that bring value to the industries of the 21st century and should be considered in the planning of an outcomes-based design curriculum by answering the following questions: How would design competencies add value to design education? What should we teach to the designers of the future so they can embrace complexity by developing forms that are creative and human, and consider the different aspects of life in a changing world?

First we discuss the impact of an outcomes-based model on design education. Then we underline the value of design in the industry through recent case studies. Finally we discuss a new model of design competencies, which would enable design educators to articulate practice-based learning outcomes that will in turn enhance the value of design education in the new era.

2 IMPACT OF THE OBE CURRICULUM MODEL ON DESIGN EDUCATION

One important issue that lies in the realm of quality assurance is a growing concern on measuring the value of a post secondary education. In this context, outcomes-based education with its learning-centered paradigm is gaining momentum in higher education systems such as Europe, US and Canada, and is replacing the traditional teacher-driven system in post secondary education.

Outcomes-based learning is not a new educational practice but has been newly adopted to ensure quality, transparency, and compatibility among the credentials. This is a transformative perspective, which introduces strategic educational planning aimed at achieving results and could answer to both the managerial purposes of quality assurance as well as the enhancement of the quality of teaching and learning in higher education.

Despite some criticism of outcome-based education (Berlach 2004, p. 5), the learning outcomes approach to teaching and learning has received strong support at an international level. In the EUA Bologna Handbook, Kennedy et al. (2006) states that "as already indicated, international trends in education show a shift from the traditional 'teacher-centered' approach to a more 'student – centered' approach. While traditionally the focus was on what the teacher did, in recent years the focus has been on what students have learned and can demonstrate at the end of a module or programme" (p. 24).

Furthermore, the Bologna Process and its subsequent aspects and strategies explore "how universities are addressing issues of modernizing the university system and focuses on learning outcomes through the Tuning Project, which sets outcomes for programs and educational systems" (Lennon 2010, pp. 12-13).

Lennon further emphasizes the need for adapting similar strategies in Canada in developing standard methods that will recognize specific credentials and will help to identify a graduate's competencies vis-à-vis stated learning outcomes and supporting employer's with measurable tools in hiring the most competent graduates. The report entitled "Tuning: Identifying and Measuring Sector-Based Learning Outcomes in Postsecondary Education" completed by Lennon (2010)

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[1] This paper is an overview of the research that I will be conducting as a PhD candidate at the Ontario Institute For Studies in Education (OISE), University of Toronto entitled "Implementation of Outcomes-Based Education in a Design Course in OCAD University: An Action Research Study".

which includes multidisciplinary participants is a strong evidence of such initiatives in Canada.

Learning outcomes, defined by the European Commission in terms of knowledge, skills and competencies to be acquired are considered 'statements of what a learner knows, understands and is able to do on completion of a learning process'. As outcomes-based measurement is still a developing field, no single or standard typology is used to determine graduates' achievement of skills and competencies and the knowledge gained. However, the broad themes commonly held as indicators of learning and achievement in higher education can be broadly divided into cognitive and non-cognitive outcomes.

While cognitive outcomes are referred to the development of skills and knowledge known as knowledge outcomes and skills outcomes; the non-cognitive outcomes include other activities that serve to support the development of students – including psychosocial development, attitudes and values, employability, and occupational competence. (Lennon 2010. p. 4)

Bloom's taxonomy are the most quoted taxonomies in the educational field and provide simple, precise, effective and measurable hierarchical structural categories of educational objectives that are incorporated within three intellectual domains: cognitive, affective and psychomotor (Savic & Kashef 2013). Learning outcomes, which are defined based on knowledge, skills and competences "are not values, beliefs, attitudes or psychological states of mind. Instead, outcomes are what leaners can actually do with what they know and have learned" (Spady 1991, p. 2).

A clear understanding of knowledge, skills and competences as key constructs of learning outcomes, and the interconnections between them is central to the definition of learning outcomes. Based on the European Qualification Framework (EPC 2008, p. C111-4), while "knowledge" is defined as "the outcome of the assimilation of information through learning" and "represents the body of facts, principles, theories and practices that is related to a field of work or study"; "skills" has been recognized as "the ability to apply knowledge and use know-how to complete tasks and solve problems". Therefore, "competence" is being defined as "the proven ability to use knowledge, skills and personal, social and/or methodological abilities, in work or study situations and in professional and personal development" (Savic & Kashef 2013, pp. 990-991).

Bloom et al.(1956) placed utmost emphasis on cognitive domain with six categories of educational objectives that can coexist during the learning process: knowledge, comprehension, application, analysis, synthesis, and evaluation. Blooms and associates have underlined five main categories within the affective domain, which represents emotional aspect of behavior in learning: receiving phenomena, responding to phenomena, valuing, organizing, and internalizing/personalizing value system.

While the psychomotor domain hasn't been tackled directly by Bloom himself but it has been analyzed and visited by other educational scholars. According to Simpson (1972), the psychomotor domain could include six categories: perception, set, guided response, mechanism, complex overt response, adaptation, and origination.

Each profession requires specific sets of knowledge, skills and competences. The "raison de vivre" of outcomes-based education is in its adaptable pedagogical framework, which has the capacity to bridge education to the real life experience as well as the professional career that one chooses to pursue.

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One of the major points of criticism about OBE that has been mostly emphasized by opposition in the US is the question of what 'significant outcomes' should be incorporated into a given curriculum. In this context, the question is "What are the significant outcomes that should be specifically considered in the planning of a design-based curriculum?"

Design as defined by The International Council societies of Industrial Design (ICSID) is "a creative activity whose aim is to establish the multi-faceted qualities of objects, processes, services and their systems in whole life cycles. Therefore, design is the central factor of innovative humanization of technologies and the crucial factor of cultural and economic exchange."

Design studio that has its roots in the medieval artisans' workshops and royal renaissance academics, where the transfer of knowledge and skills were occurred through the 'master-apprentice' relationship, constitutes the didactic model for design education. The idea of 'learning by doing' that has been the core practice in design education throughout the 20th century, has developed an innovative and flexible mode of learning that encompasses a repository of knowledge as well as a wide range of skills and competences within both cognitive and affective domains.

The current teaching approach in design education involves realistic or simulated design experiences that enhance the students' learning experience within the studio culture where "knowledge and intellectual skills are acquired in a similar way, and are inseparable. It is not possible to make a clear-cut division between them; as the level of knowledge applicability increases, it is becoming closer to skills" (Savic & Kashef 2013, p. 1001).

The definition of design profession and the nature of studio-based education in design suggest that some very important cognitive terms such as 'creativity', 'imagination' and 'originality' should be considered within an OBE implementation process. How do we construct measurable learning outcomes that capture the nature of these terms? How do we enable students to understand the concept of creativity/ imagination/ originality and how do we measure them? (Davies 2012)

3 MEASURING THE VALUE OF DESIGN: A RESEARCH-BASED DESIGN VALUE MODEL

How design activity brings value to business? A study of role of design in Canada entitled "*Why Invest in Design? Insights From Industry Leaders"* conducted by Ontario's Design Industry Advisory Committee working with the Martin Prosperity Institute at the Rotman School of Management, University of Toronto and financially supported by Industry Canada shed light on the impacts and benefits of investing in design.

This research project is a case study of internationally recognized Canadian industries that are working at the cutting edge of innovation through in-depth interviews of their leaders who believe that "Design is an enabling discipline, and designers working with professionals from other disciplines add value to the process and to the end result" (Gould et al., 2014). The in-depth interviews are based on a questionnaire that focuses on the role of design in corporate strategy, financial investment, innovation and new product development, manufacturing process and corporate culture.

Based on 10 positive indicators of design investment, the findings of this study underline the benefits of implementation of design, as the core activity of the

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organization and re-define design as: long-term & short-term, disruptive, embedded, intensely focused, owned, tested, based on technology & materials, process, holistic, diverse.

The synthesis of the findings of this qualitative research displays five main characteristics of the design activity from the point of view of the decision-makers within top Canadian industries:

1. Design as a *Catalyst for change* that adds financial value to the organization and create differentiation;
2. Design as a *Vision* for long-term investment and quality excellence;
3. Design as *Enabler* which makes technology accessible to users;
4. Design as a *Holistic approach* that brings together all disciplines and a diverse creative talent pool;
5. Design as a *sophisticated Process,* which supports a systematic approach to the efficient management of the company and its human, physical and financial resources.

The 'Four Powers of Design Model' developed by Dr. Borja De Mozota (2006) based on the Balanced Scorecard (BSC)- a widely adopted management and strategic planning tool created by Drs. David Norton and Robert Kaplan (of the Harvard Business School)- promotes the value of design within four perspectives of the BSC framework:

1. Design as Transformer (aligned with BSC's Learning and Growth Perspective) identifies how design creates new futures.
2. Design as Integrator (aligned with BSC's Process Perspective) showcases how design builds connections, either interpersonal or intellectual or process.
3. Design as Differentiator (aligned with BSC's Customer Perspective) highlights how design helps to stand out in a crowd.
4. Design as Good Business (aligned with BSC's Financial Perspective) how design affects the bottom line. (O'Grady & O'Grady 2013, pp. 75-77)

While research-based studies show the crucial role of design in adding value to businesses, there are corporate clients who still consider design schools as 'idea boxes' and not as schools where students learn the skills that will help them to become experts in a specific profession. The question is 'How design schools of the 21st century can ensure the business world that their graduates have acquired specific knowledge, skills and attitudes that make them ready to practice design as a profession and become an expert in their field?' Another question can be "What are the specific competencies of designers which make them unique and different from other professionals?"

According to Bruce Archer 'Design with a capital D' is "the collected experience of the material culture and the collected body of experience, skill and understanding embodied in the arts of planning, inventing, making and doing… Design has its own distinct 'things to know, ways of knowing them and ways of finding out about them" (Cross 2006, p. 17).

While Design has been defined as both "an activity (the design process) and the outcome of that activity or process (a plan or form)" (Borja De Mozota 2003, p.

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3), a designer is "a creator of form who understands creation in the context of predefined imperatives established by other professionals and places human values over technological ones" (Bernsen, 1987). Therefore, design becomes "a process of creation and decision making and cannot be replaced by other activities or professions" (Borja De Mozota 2003, p. 5).

In this context, the perception of design graduates of their own competencies and aptitudes becomes paramount in the recognition of their expertise by the business world and institutions in general.

4 CREATIVITY AND LEARNING OUTCOMES IN DESIGN EDUCATION

The importance of idea generation as a new way to sell design to business, demonstrates that the 'creative problem-solving' skill is one of the backbones of designer's competencies. In order to measure creativity as one of the most crucial aspect of design activity and an important outcome of design education, we need to come up with an understanding of the meaning and sub-meanings of creativity and creative thinking.

Creativity like design can be defined from two points of view: as a process and/or as demonstrated through a final creative production. Professor Todd Lubart (2001), in his article entitled 'Models of the Creative Process: Past, Present and Future' reviews the models of creativity, with an emphasis on creativity as a model of problem solving.

While Guilford (1950) proposed a program of research concerning the identification, measurement and validation of some creativity-relevant abilities such as sensitivity to problems, capacity to produce many ideas, ability to change one's mental set, ability to re-organize, ability to deal with complexity and ability to evaluate; Lubart believes that our understanding of the abilities and basic cognitive processes involved in creativity has been broadly developed in the past 50 years.

Traditionally, the complete creative act involves four important steps identified as preparation, incubation, illumination and verification. Other diverse proposals about the creative process have focused on the processes of *idea generation* and *idea evaluation*. The creative problem-solving framework developed from Osborn's (1953) work, proposed a stage-based view of the creative process. However, a recent reformulation of the model moves away from the idea of a fixed sequence of activities in favor of three sets of processes, which are: *understanding the problem*, *generating ideas* and *planning for action*. The sequence in which these processes occur can vary across problem tasks or problem solvers. (Lubart 2001, pp.295-300)

Furthermore, Guilford (1967) proposed a model of problem solving that addressed *creative production* as a process that consists of:

- an initial stage of *filtering* (attention aroused and directed),
- a stage of *cognition* (the problem is sensed and structured),
- a stage of *production* (ideas are generated with divergent and convergent thinking involved),
- another stage of *cognition* (new information is obtained) followed by another stage of *production*, in a cycle that can continue until the task is completed.
- A process of *evaluation* is hypothesized to occur between each of the stages just described. Finally, work will stop once a satisfying solution is obtained.

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The analysis of creativity as a process that comprises sequence-based but flexible sub-processes demonstrates that creativity in design education should be considered within both cognitive and affective domains of learning outcomes. The question is "How do we as design educators plan our teaching so that creativity is enhanced in the process of learning and is evident in the products of learning?"

If we recognize creativity as one of the main design competencies that should be learned and occurred in design education, the value of this competency can be measured through the alignment of learning outcomes and assessment methods within project-based design courses. In this context, outcomes should be related to cognition that comprise both knowledge content and understanding as well as to abilities and skills that comprise those attributes commonly known as transferable skills, key skills, core skills. (Davies 2012, pp. 9-12)

Where learning is about becoming a designer, students tend to experiment with processes and consider the outcome of learning to be about innovation and change. Their focus is mostly on the discovery of a personal identity, self-expression, reflection and research, and the integration and expansion of ideas (thinking) and practice (doing). They also actively work toward the production of a form that can be recognized as creative. In order to capture the whole learning experience, educators should plan assessment criteria that articulate the complexity of the creative process within different levels of achievement upon which the student can build in later projects. In another word, we need to plan the alignment of what has been achieved (learning outcomes) and how well students performed as a result of tackling the learning outcomes (assessment criteria).

5 MOVING TOWARD A COMPETENCY-BASED MODEL OF DESIGN EDUCATION

In order to understand how much design professionals are aware of their own knowledge, skills and competencies, we asked five design graduates with more than 1 and less than 5 years of experience in the field of design to answer 3 questions, using the 'Designer's Skills Tool' (Table 1) developed by Professor Borja De Mozota in 2011. The questions are:

1. Based on the relevance of each competency within your design practice, please rank them;
2. Please rank the competencies that you think you have gained through your undergraduate education;
3. As a design practitioner which 5 competencies do you think are most essential to be emphasized in the learning outcomes of a design undergraduate curriculum in order to meet the needs of today's marketplace? Why?

The analysis of this study shows that design practitioners have different levels of awareness in the articulation of their competencies:

— They easily identify their overall skills such as their knowledge of materials, technology and form as well as applied skills such as computer skills and practical design skills;
— They have more difficulty in articulating some project-based skills such as observation, research process, framing problems or intuitive thinking and human empathy while the study of their design process shows that

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they have implemented those skills in the completion of their project without being aware of them.

6 THE ROAD AHEAD

My PhD dissertation is a case study of my own teaching practice through the implementation of the principles of outcomes-based education in the "Introduction to Design Management" course that I will be teaching in Winter 2015 at OCAD University in Toronto. The development of this course is in response to the growing needs of industry in hiring graduates who are equipped with design competencies that add value to their business and differentiate them in a crowded and competitive marketplace, as "the advance of communication technology has broken down the physical barriers and has opened the design profession to the full effect of globalization (O'Grady & O'Grady 2013, pp. 2-5)".

This study aims to answer the following research questions:

1. How do I develop learning outcomes that are consistent with required design competencies?
2. How do I create an effective constructive alignment of 'learning outcomes and 'assessment tools' in my course?
3. How do I effectively evaluate my teaching practice?
4. How do I improve my teaching based on self-evaluation and reflective practice?

My research methodology is a qualitative approach using 'Action Research' as my strategy of inquiry. My interest in action research as my research methodology is influenced by Habermas' theory of communicative action that promotes dialogue which is 'central to human life and combines both reflection and action leading to praxis" (Joyce & Tutela 2006, p. 65) as well as the concept of 'reflective practitioner' introduced by Schön which in turn is based on Dewey's studies of 'human experience as producer of knowledge'.

Reflective planners are practitioners who become critically involved with their own practice in order to improve their works. By taking action, they give meanings to their lives as they try to live their values in their practices. By generating a 'living form' of theory, they study their own practice and produce personal theories from within practice.

I believe that my experience as I implement outcomes based education in the findings of this action research study will support me in my current teaching practice and will help me to contribute effectively to the facilitation of the transitional process at both program and institutional levels at the site of study. The dissemination of the findings of this study will also identify best practices at OCAD University. And, although the findings will not be generalizable from this case study, they will provide other similar settings with greater understanding of OBE and perhaps practical guidelines of the development of learning outcomes within creative-based programs.

7 CONCLUSION

Measuring the value of education in regard to what graduates can achieve upon the completion of their education is becoming a recurring issue of higher education in today's globalized economy. In this context, the importance of

Design as a profession within the realm of innovative economy is leading design education toward embracing outcomes-based curriculum frameworks which value design competencies and empower design graduates in playing a crucial role in the success of their company. Therefore, designers should be able to articulate the knowledge, skills and attitudes that they have acquired through their education and are implementing within different levels of their project in a clear and measurable way.

While some designer's skills such as technical and social skills are easier to be measured in a business sense, other important cognitive and sensitive skills such as creativity or idea generation that are the core skills of the design profession may be more difficult to be measured. In this order design education is moving toward a competency-based model, which aims to provide the business world with a better understanding of the value of design as an activity that can realize significant change with positive financial implications and can support them in differentiating themselves from the competition.

8 REFERENCES

Berlach, R. G. (Nov 28 – Dec 2, 2004). Paper presented at The Australian Association for Research in Education Conference, *Outcomes-Based Education & the Death of Knowledge*. University of Melbourne, Victoria, Australia.

Bernsen, J. (1987). *Design Management in Practice*, EEC European Design Editions, *12 Principles in Design Management*, Danish Design Council.

Borja De Mozota, B. (2003). *Design Management: Using Design to Build Brand Value and Corporate Innovation.* New York: Allworth Press.

Borja De Mozota, B. (2006). The Four Powers of Design: A Value Model in Design Management. Design Management Review.

Borja De Mozota, B. (2011). *Design Economics–Microeconomics and Macroeconomics: Exploring the Value of Designers' Skills in Our 21st Century Economy.* 17–39. CUMULUS // DRS SIG on Design Pedagogy 1st International Symposium for Design Education Researchers La Bourse du Commerce, Paris 18–19 May 2011

Cross, N (2006). *Designerly Ways of Knowing.* London: Springer-Verlag.

Davies, A. (2012). *Learning Outcomes and Assessment Criteria in Art and Design: What's the Recurring Problem?* Retrieved from http://arts.brighton.ac.uk/projects/networks/issue-18-july-2012/learning-outcomes-and-assessment-criteria-in-art-and-design.-whats-the-recurring-problem.

European Union. (2008). *The European Qualifications Framework for Lifelong Learning.* Brussels: European Commission, Education and Training. Available at: http://ec.europa.eu/education/policies/educ/eqf/rec08_en.pdf

Joyce, P., and Tutela, J. (2006). We Make Our Road by Talking: Preparing To Do Educational Research. In K. Tobin & J. Kincheloe, (Eds.), *Doing Educational Research- A Handbook,* (pp. 59-84). The Netherlands: Sense Publishers.

Kennedy D., Hyland A., & Ryan N. (2006). Writing and Using Learning Outcomes: A Practical Guide. *EUA Bologna Handbook – Making Bologna Work.* (Article C 3.4-1 in Eric Froment, Jürgen Kohler, Lewis Purser and Lesley Wilson). Berlin: Raabe Verlag.

Lennon, M. C. (2010). *Signalling Abilities and Achievement: Measuring and Reporting on Skill and Competency Development.* Toronto: Higher Education Quality Council of Ontario.

Lubart, T. I. (2001). *Models of the Creative Process: Past, Present and Future.* Creativity Research Journal, 2000-2001, Vol. 13, Nos. 3 & $, 295-308.

O'Grady, J. V., & O'Grady, K. V. (2013). *Design Currency: Understand, Define, and Promote the Value of Your Design Work*. Pearson Education.

Savic, M., & Kashef, M. (2013). Learning Outcomes in Affective Domain Within Contemporary Architectural Curricula. *International Journal of Technology and Design Education, 23, 987-1004.* doi: 10.1007/s10798-013-9238-8.

Spady, W., & Marshall, K. (1991). *Beyond Traditional Outcome-Based Education*. Retrieved from http://www.ascd.org/ASCD/pdf/journals/ed_lead/el_199110_spady.pdf.